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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,410	01/15/2004	Jae-dong Lee	SEC.861D	3377

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EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/757,410	LEE ET AL.	
	Examiner	Art Unit	
	Lynette T. Umez-Eronini	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 13-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 10/023,948.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/15/2004</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Objections

1. Claim 14 is objected to because of the following informalities:
On line 2, "borophosposilicate" and
On line 3, "phosphoresilicate" is misspelled. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 13-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 13, lines 2-3 "simultaneously removing a conductive layer, a silicon oxide layer and a silicon nitride layer using a polishing slurry . . ." is indefinite because it is unclear whether the claim requires the three layers be removed by polishing them at the same time.

In claim 13, lines 5-6, " $[-CH_2CH_3N(CH_2CH_2NH_2)-]_x[-CH_2CH_2NH_2-]_y$, where x and y are 0 . . ." is indefinite because if both x and y are 0, then the polyethylene imine structure as claimed by applicants would not exist.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al. (US 6,354,913).

Miyashita teaches polishing a semiconductor wafer or a filmed formed thereon using a polishing agent that comprises an abrasive and water (Abstract). Miyashita further teaches the polishing agent comprises a pH controller such as a water-soluble amine, which includes polyethylene imine (same as applicants' pH controlling agent and polyethylene imine), (column 7, lines 19-53). Miyashita also teaches polishing a semiconductor substrate (column 10, lines 62-64) and the silicon substrate comprises

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silicon nitride **2** film, silicon oxide film **6** such as BPSG, and polycrystalline silicon film **12** (same as applicants' conductive film). The aforementioned reads on,

A chemical mechanical polishing method, comprising simultaneously removing a conductive layer, a silicon oxide layer and a silicon nitride layer using a polishing slurry comprising an abrasive, deionized water, a pH controlling agent, and polyethylene imine having a molecular structure of $[-CH_2CH_2N(CH_2CH_2NH_2)-]_x[-CH_2CH_2NH_2-]_y$, where x and y are 0 or positive integers, **in claim 13**;

wherein the silicon oxide layer is one selected from the group consisting of a borophosphosilicate glass (BPSG), a phosphoresilicate glass (PSG), a borosilicate glass (BSG), a high density plasma (HDP) silicon oxide layer, an undoped silicate glass (USG), a high thermal (HT)-USG, and a plasma enhanced (PE)-silicon oxide layer, **in claim 14**; and

wherein the silicon nitride layer is a dielectric material having a basic formula of Si_3N_4 , **in claim 15**;

Miyashita differs in failing to teach simultaneously removing a conductive silicon oxide, and a silicon nitride layer using a polishing slurry as recited **in claim 13**.

Since Miyashita's polishing agent is the same as the one claimed by applicants and is used in polishing a semiconductor wafer, which is known to comprise a conductive, silicon oxide and silicon nitride layer, then it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to use Miyashita's polishing agent in the same manner as claimed applicants for the purpose of employing a water-soluble amine that has a weak basicity that tends to be excellent

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in preservation capability and polishing function when used in a polishing agent (Miyashita, column 7, lines 65-67).

Miyashita differs in failing to teach wherein the polyethylene imine comprises more than 0.02 wt % of the polishing slurry, **in claim 16**.

Since Miyashita illustrates the specific combination of polishing slurry is known, then it would have been obvious to one of ordinary skill in the art at the time the invention was made to select any concentration of (wt %) of polyethylene imine in the Miyashita reference that would effectively accomplish the method of the disclosed composition because it has been held that there is no invention where the difference in proportions is not critical and was ascertained by routine experimentation because the determination of workable ranges is not considered inventive. See *In re Swain and Adams*, 70 USPQ 412 (CPA 1946).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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September 9, 2005

NADINE G. NORTON
SUPERVISORY PATENT EXAMINER

